CLAIMS

What is claimed is:

1. A method of protecting spinal nerves and structures during spinal disc heat lesioning procedures, said method comprising:

inserting a first hollow needle comprising a first thermocouple into a first space between the spinal disc and an ipsilateral root;

monitoring temperature near the ipsilateral root with the first thermocouple during spinal disc heat lesioning; and

reducing the temperature near the ipsilateral root in response to the monitoring to protect the ipsilateral root from thermal damage.

2. The method according to claim 1, wherein inserting a first hollow needle comprising a first thermocouple into a first space between the spinal disc and a ipsilateral root comprises contacting the first needle to a surface of the spinal disc.

3. The method according to claim 1, further comprising:

inserting a second hollow needle comprising a second thermocouple into a second space between the spinal disc and a contralateral root;

monitoring temperature near the contralateral root with the second thermocouple during spinal disc heat lesioning; and

reducing the temperature near the contralateral root in response to the monitoring to protect the contralateral root from thermal damage.

4. The method according to claim 1, further comprising:

inserting a dual purpose needle comprising a thermocouple and an injection bore into a spinal canal at a level equivalent to that of the disc;

monitoring temperature in the spinal canal with the thermocouple of the dual purpose needle during spinal disc heat lesioning, and

reducing the temperature in the spinal canal in response to the monitoring to protect the spinal nerves root from thermal damage.

5. The method according to claim 4, wherein reducing the temperature in the spinal canal in response to the monitoring to protect the spinal nerves from thermal damage comprises injecting a cooling fluid into the spinal canal through the injection bore of the dual purpose needle.

6. The method according to claim 1, further comprising:

inserting a dual purpose needle comprising a thermocouple and an injection bore into an epidural space at a level equivalent to that of the disc;

monitoring temperature in the epidural space with the thermocouple of the dual purpose needle during spinal disc heat lesioning, and

reducing the temperature in the epidural space in response to the monitoring to protect the spinal nerves root from thermal damage.

7. The method according to claim 6, wherein reducing the temperature in the epidural space in response to the monitoring to protect the spinal nerves from thermal damage comprises injecting a cooling fluid into the epidural space through the injection bore of the dual purpose needle.

8. The method according to claim 1, wherein reducing the temperature near the ipsilateral root in response to the monitoring to protect the ipsilateral root from thermal damage comprises halting spinal disc heat lesioning.

9. The method according to claim 1, wherein reducing the temperature near the ipsilateral root in response to the monitoring to protect the ipsilateral root from thermal damage comprises injecting a cooling fluid into the first space through the first hollow needle.

10. The method according to claim 1, wherein inserting a first hollow needle comprising a first thermocouple into a first space between the spinal disc and a ipsilateral root comprises inserting a spring tip needle into the first space between the spinal disc and the ipsilateral root.

11. A process for repairing a spinal disc annulus, said process comprising:

inserting a hollow needle comprising a conductive portion and an injection port into an annulus of the spinal disc;

injecting a sealant material into the annulus through the injection port to prevent a nucleus of the spinal disc from leaking into the annulus; and

lesioning a portion of the annulus with thermal energy applied through the conductive portion of the hollow needle.

12. The process according to claim 11, further comprising activating the sealant material to form a seal by applying thermal energy thereto through the conductive portion of the hollow needle.

13. The process according to claim 11, wherein injecting a sealant material into the annulus comprises injecting a fibrin-based sealant into the annulus.

14. The process according to claim 11, wherein inserting a hollow needle comprising a conductive portion and an injection port into an annulus of the spinal disc comprises inserting a hollow needle with a flexible spring tip having a conductive end into the annulus.

15. The process according to claim 11, wherein lesioning a portion of the annulus with thermal energy applied through the conductive portion of the hollow needle comprises applying RF thermal energy through the conductive portion of the hollow needle to lesion the annulus tissue.

16. The process according to claim 11, further comprising examining the spinal disc for motor nerve presence by applying electric current through the conductive portion of the hollow needle prior to lesioning.

17. A method for performing spinal disc lesioning, said method comprising:
inserting a hollow needle comprising a conductive portion into an annulus of a spinal disc;
lesioning a portion of the annulus with thermal energy applied through the conductive portion of the hollow needle.

18. The method according to claim 17, wherein inserting a hollow needle comprising a conductive portion into an annulus of a spinal disc comprises inserting a hollow needle with a flexible spring tip having a conductive end into the annulus.

19. The method according to claim 17, wherein lesioning a portion of the annulus with thermal energy applied through the conductive portion of the hollow needle comprises applying RF thermal energy through the conductive portion of the hollow needle to lesion annulus tissue.

20. The method according to claim 17, wherein inserting a hollow needle comprising a conductive portion into an annulus of a spinal disc comprises passing a thermally insulative cannula to the spinal disc and inserting the hollow needle into the annulus through the cannula.

21. The method according to claim 17, wherein inserting a hollow needle comprising a conductive portion into an annulus of a spinal disc comprises passing a blunt tipped introducing cannula to the spinal disc through the abdomen and inserting the hollow needle into the annulus through the cannula.

22. The method according to claim 17, further comprising monitoring temperature of a surface of the spinal disc during spinal disc lesioning and reducing the temperature in response to the monitoring to protect nerve structures near the spinal disc from thermal damage.

23. The method according to claim 22, wherein monitoring temperature of a surface of the spinal disc comprises inserting a dual purpose needle comprising a thermocouple and an injection bore to contact a surface of the spinal disc in a space between the spinal disc and a nerve root to monitor temperature of the disc surface near the nerve root.

24. The method according to claim 23, wherein reducing the temperature in response to the monitoring to protect nerve structures near the spinal disc from thermal damage comprises injecting a cooling fluid into the space between the spinal disc surface and the nerve root through the injection bore of the dual purpose needle.

25. The method according to claim 23, wherein reducing the temperature in response to the monitoring to protect nerve structures near the spinal disc from thermal damage comprises halting spinal disc lesioning to allow the spinal disc to cool.

26. The method according to claim 17, further comprising monitoring temperature near a spinal nerve structure during spinal disc lesioning and reducing the temperature in response to the monitoring to protect nerve structures near the spinal disc from thermal damage.

27. The method according to claim 26, wherein monitoring temperature near a spinal nerve structure comprises inserting a dual purpose needle comprising a thermocouple and an injection bore into the spinal canal at a level equivalent to that of the spinal disc to monitor temperature in the spinal canal near the spinal disc.

28. The method according to claim 27, wherein reducing the temperature in response to the monitoring to protect nerve structures near the spinal disc from thermal damage comprises injecting a cooling fluid into the spinal canal through the injection bore of the dual purpose needle.

29. The method according to claim 26, wherein monitoring temperature near a spinal nerve structure comprises inserting a dual purpose needle comprising a thermocouple and an injection bore into the epidural space near the spinal disc to monitor temperature in the epidural space.

30. The method according to claim 29, wherein reducing the temperature in response to the monitoring to protect nerve structures near the spinal disc from thermal damage comprises injecting a cooling fluid into the epidural space through the injection bore of the dual purpose needle.

31. The method according to claim 17, further comprising examining the spinal disc for motor nerve presence by applying electric current through the conductive portion of the hollow needle prior to lesioning.

32. A needle for monitoring a spinal disc lesioning procedure, comprising:

a hollow shaft;

an injection opening allowing access to a bore of the hollow shaft, configured for allowing injection therethrough; and

a thermocouple attached to the hollow shaft for monitoring temperature of the tissue surrounding the needle.

33. The needle of claim 32, further comprising a flexible tip disposed at a distal end of the hollow shaft.

34. The needle of claim 32, wherein the injection opening is formed by spaces between the windings of a coil spring forming the flexible tip.

35. A kit for performing a spinal disc procedure, comprising:

at least a first monitoring needle comprising a hollow shaft having a proximal and distal end, an injection opening allowing access to a bore of the hollow shaft, configured for allowing

injection therethrough, a thermocouple attached to the hollow shaft for monitoring temperature of the tissue surrounding the at least a first monitoring needle;

an electrode needle, comprising an electrode shaft having a distal end and a proximal end, and a conductive portion for applying energy to spinal disc tissue.

36. The kit of claim 35, wherein the conductive portion of the electrode needle comprises a conductive blunt tip at a distal end of the electrode shaft.

37. The kit of claim 35, wherein the electrode shaft of the electrode needle comprises a hollow shaft.

38. The kit of claim 37, wherein the electrode needle further comprises an injection opening in fluid communication with a bore of the hollow shaft, allowing injection therethrough.

39. The kit of claim 35, further comprising a second monitoring needle comprising a hollow shaft having a proximal and distal end, an injection opening allowing access to a bore of the hollow shaft, and a thermocouple attached to the hollow shaft for monitoring temperature of the tissue surrounding the at least a first monitoring needle

40. The kit of claim 35, further comprising an openable package having a top, bottom, and sides defining a space for containing the at least a first monitoring needle and the electrode needle in a sterile manner.

41. An electrode needle for lesioning spinal disc tissue, said needle comprising:

a hollow shaft having a flexible distal tip and a proximal end; and

a conductive portion for applying lesioning energy to spinal disc tissue.

42. The electrode needle of claim 41, wherein the conductive portion comprises a conductive blunt tip at a distal end of the flexible distal tip.

43. The electrode needle of claim 41, further comprising an injection opening in fluid communication with a bore of the hollow shaft, allowing injection therethrough.

44. The electrode needle of claim 41, further comprising a thermally insulative insertion cannula.